CALIFORNIA DIVISION OF MINES AND GEOLOGY

Fault Evaluation Report FER-37

April 11, 1977

1. Name of fault: Big Pine fault ("west extension").

2. Location of fault: Western Santa Barbara County (see fig. 1)

3. Reason for evaluation: Located in 1976 study area of the 10-year program for fault evaluation in the state. The County of Santa Barbara classifies this fault(?) as active in their seismic safety element (Moore and Taber, 1974).

4. List of references:

a) Estes, J.E., 1973, Use of ERTS-A data to assess and monitor change in the west side of San Joaquin Valley and central coastal zone, Progress report, NASA contract 5-21827.

b) Comstock, S.C., In preparation, Stratigraphy and structure along the western Big Pine fault, Santa Barbara County, Masters thesis, University of California at Santa Barbara.

c) Hamilton, R.M., 1969, Seismicity and associated effects, Santa Barbara region, in Geology, petroleum development, and seismicity of the Santa Barbara channel region, U.S. Geological Survey, Professional Paper 679-D, p. 47-68.

d) Townley, D.S., Allen, M.W., 1939, Descriptive catalog of earthquakes of the Pacific coast of the United States 1769-1928, Bulletin Seismological Society of America, v. 29, no. 1.

e) Moore and Taber, 1974, Santa Barbara County comprehensive plan -- Seismic Safety Element, 93 p.

5. Summary of available data:

The so-called Big Pine fault "west extension" is shown in Moore and Taber (1974) as an air photo lineation. Comstock (in preparation) may eventually delineate a fault, but his data is not presently available.

The following is a discussion by Moore and Taber (1974) concerning this fault(?):

> "As previously noted, the west end of the Big Pine fault curves to the northwest and intersects the northwest trending Camuesa fault north of Lake Cachuma. However, an east-west trending lineation has been noted on satellite imagery (NASA Earth Resources Technology Satellite, ERTS-1) which could be a western continuation of the Big Pine fault (Estes, 1973; Comstock, in preparation). This lineation extends 43 miles westward from the mapped terminus of the fault, through the town of Los Alamos and to the coast through San Antonio Creek. A University of California at Santa Barbara graduate student, Steve Comstock, is presently involved in study of this feature as well as the western area of the mapped Big Pine fault. Comstock's preliminary investigations on the western continuation of the fault included study of 1:120,000 and 1:60,000 color infrared aerial photographs of the area of the ERTS-1 lineament, and subsequent field study of the ground locations. East-west trending lineaments were observed and substantiated by ground check in the area between the Camuesa fault and west of Los Alamos. Between 1934 and 1966, three earthquake epicenters greater than magnitude 4, and five epicenters of 3 to 4 magnitude occurred along this ERTS-1 lineament (Hamilton, et al., 1969). Several damaging earthquakes occurred along the lineation near

Los Alamos during 1902 and 1915 (Townley and Allen, 1939); at least three of these earthquakes are estimated to be of magnitude 6 or greater (Lamar, et al., 1973, pocket map). Additionally, there is a pronounced difference in surface and subsurface geologic structural trends north and south of this possible western continuation of the Big Pine fault. Structures north of the lineament have an average trend of north-northwest, whereas the median structural grain south of this line trends approximately 40° more westerly (Comstock, in preparation). This contrast reflects the same Coast Ranges-Transverse Ranage boundary marked by the Big Pine fault to the east.

During a recent landslide investigation by Moore and Taber on Vandenberg Road south of San Antonio Creek, a review of 1938 aerial photographs disclosed offsets of three small stream gullies. The gullies are offset in a left lateral sense, and when aligned with a straight portion of the valley wall show a trend of about N60W. The alignment of these jogs in the local drainage pattern could be fortuitous or could represent ground displacement along a small fault during historic times (1902 or 1915) associated with movement along the westerly extension of the Big Pine fault. The jogs are more subdued in 1960 photographs.

Thus, seismic and structural evidence support a western continuation of the Big Pine fault to the Pacific Coast. However, Willott (1972) shows no significant elevation change across the possible western continuation of the Big Pine fault near the coast along San Antonio Creek during a thirteen year period, 1958-1971."

6. Air photo interpretation: None.

7. Field observations: None.

8. Conclusions: The evidence quoted in Moore and Taber, above, is not conclusive for the existence of an extension of the Big Pine fault.

9. Recommendations:

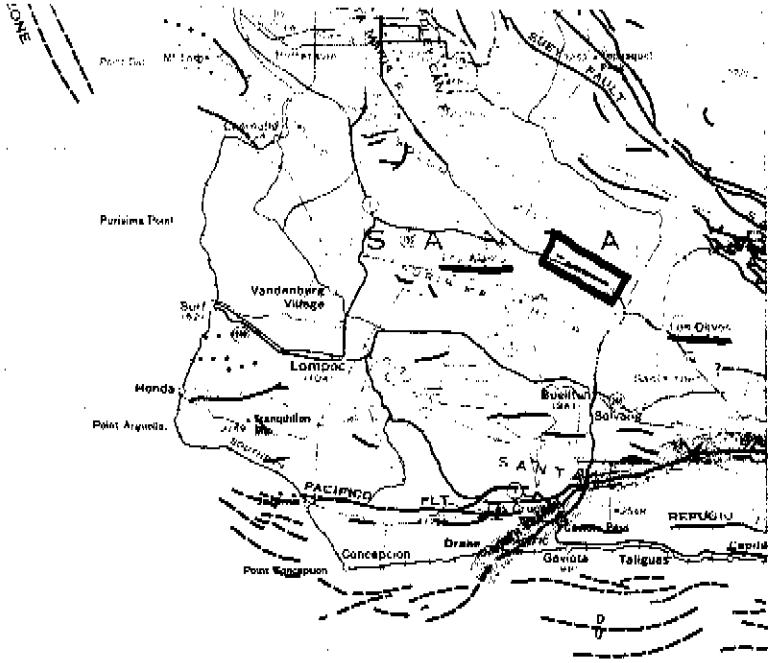
I recommend not zoning the "west extension" of the Big Pine fault for special studies at this time.

10. Investigating geologist's name; date:

Edward J Bortugno

EDWARD J. BORTUGNO
Geologist
April 11, 1977

I agree with recommendation; fault may not exist.
EJBH
4/13/77



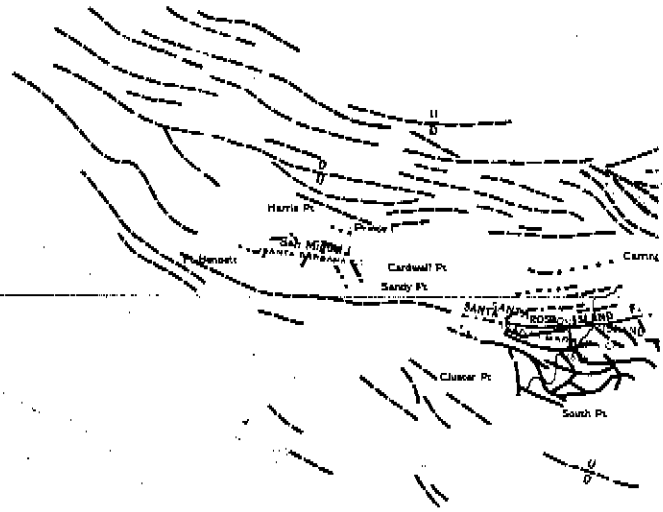


Fig 2

From Jennings (1975)